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NEW PSOCIDAE AND AN ABERRANT NEW MYOPSOCID (PSOCOPTERA) FROM HONG KONG

By Ian W. B. Thornton

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(Read 4th May, 1960)

With 47 Text-figures

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I. Introduction

This paper forms part of a taxonomic survey of the Psocoptera of Hong Kong (Thornton, 1959*a* and *b*) and deals with the family Psocidae except for species of the *Trichadenotecnum-Loensia* group, to be dealt with separately later. The only representative so far discovered in the Colony of a related family, the Myopsocidae, is also described.

Although collections of Psocoptera from Malaya, Indonesia, the Philippines, Formosa and Japan have been described, there is very little literature on forms from the mainland of China. The Psocidae are a large and successful family, and it is therefore not surprising that Hong Kong is relatively rich in species, nor that all species so far collected are new.

II. Psocidae

Neoblaste gen. n.

In fore wing vertex of pterostigma smoothly rounded, *rr* and *m* fused for a certain length, discal cell widening anteriorly. Hypandrium of male symmetrical, with bluntly rounded lateral lobes, two pairs of lateral accessory sclerites, one median accessory sclerite; parameres stout, symmetrical, free, with apical hooks.

Type species: *Neoblaste papillosus* sp. n.

The genus defined above is included in the subfamily Amphigerontiinae Badonnel, having a male hypandrium including the eighth sternite and parameres which are free distally. Of the Amphigerontine genera, *Elaphopsocus* Roesler, *Neopsocopsis* Badl. and *Amphigerontia* Kolbe have been satisfactorily defined as discrete taxa on venational and genitalic characters, and on these considerations the present genus is distinct from all three. The position is less satisfactory with regard to the *Blaste-Euclismia* complex of forms, to which, on venational characters, *Neoblaste* seems more allied.

The genus *Blaste* was erected by Kolbe (1883*a*) on the basis of the venation of a single male specimen from Pennsylvania, particular importance being placed on the relative proportions of the closed and open discal cells and (as a character distinguish-

ing it from *Amphigerontia*) the narrow, elongate pterostigma without any clear vertex. Kolbe's type species, *Blaste juvenilis*, was later equated with *Psocus quietus* Hagen (Chapman, 1930), of which genitalic descriptions were provided. Other species have since been included, the genus has been redefined in a new wide sense and, chiefly on the basis of male genitalia, divided into various subgenera (Roesler, 1944 ; Badonnel, 1955), one of which is *Blaste* Kolbe *s. str.* While Roesler gives *Euclismia* End. as a synonym of *Blaste* in his new wide sense, Badonnel maintains it as a subgenus.

From the descriptions, none of the North American Amphigerontines seem to agree fully with Kolbe's venational requirements. While *longipennis* Banks and *subapterus* Chapman do so in pterostigma shape, and *inornatus* Aaron and *lithinus* Chapman agree fairly well in the proportions of the discal cells, the rest, including *quietus* Hagen, apparently do not satisfy either requirement. The North American species are divisible on venation and male and female genitalia into at least three taxa, and it is uncertain which of these, if any, is to be identified with *Blaste* Kolbe. The *quietus* group, which includes *oregonus* Banks and *subquietus* Chapman, shows certain similarities with *Euclismia quadrimaculata* (Latr.).

The subfamily is thus in need of revision, and when this is done it seems likely that the numerous subgenera of the *Blaste* complex will be accorded generic rank. Apart from the fact that the case for the erection of subgenera is not generally supported, it seems possible that *Blaste*, being of unknown applicability, may have to be regarded as a "*genus inquirendum*" and generic terms of reference provided for excluded species.

I have thus assigned the two following species to a new genus, *Neoblaste*, on the basis of the highly peculiar male hypandrium.

The present state of partition of the *Blaste-Euclismia* complex is summarised in the accompanying key modified from Roesler (1944) and including Badonnel's (1955) new categories and the present genus.

Key to Genera and Subgenera of the Blaste-Euclismia *Complex*

1	Apical lobe of male hypandrium with median incision	2
–	Apical lobe of male hypandrium entire, or lacking	3
2	Hypandrium simple	**Euclismia** Enderlein
–	Hypandrium with posterolateral projections, apical lobe as a pair of sclerotised structures each bifurcating into two stout points .	**Euclismiopsis** Badonnel
3	Hypandrium symmetrical	4
–	Hypandrium asymmetrical	5
4	Hypandrium with sharply pointed lateral lobes	**Blaste** Kolbe *s. str*
–	Hypandrium with lateral lobes not pointed	6
5	Parameres very slender, symmetrical, united at base .	**Blastopsocidus** Badonnel
–	Parameres stout, asymmetrical, free	**Blastopsocus** Roesler
6	Lateral lobes of hypandrium ear-shaped, no accessory sclerites, parameres united at base	**Blastopsis** Badonnel
–	Lateral lobes of hypandrium bluntly rounded, with accessory sclerites, parameres free	**Neoblaste** gen. n.

Neoblaste papillosus sp. n.

Female

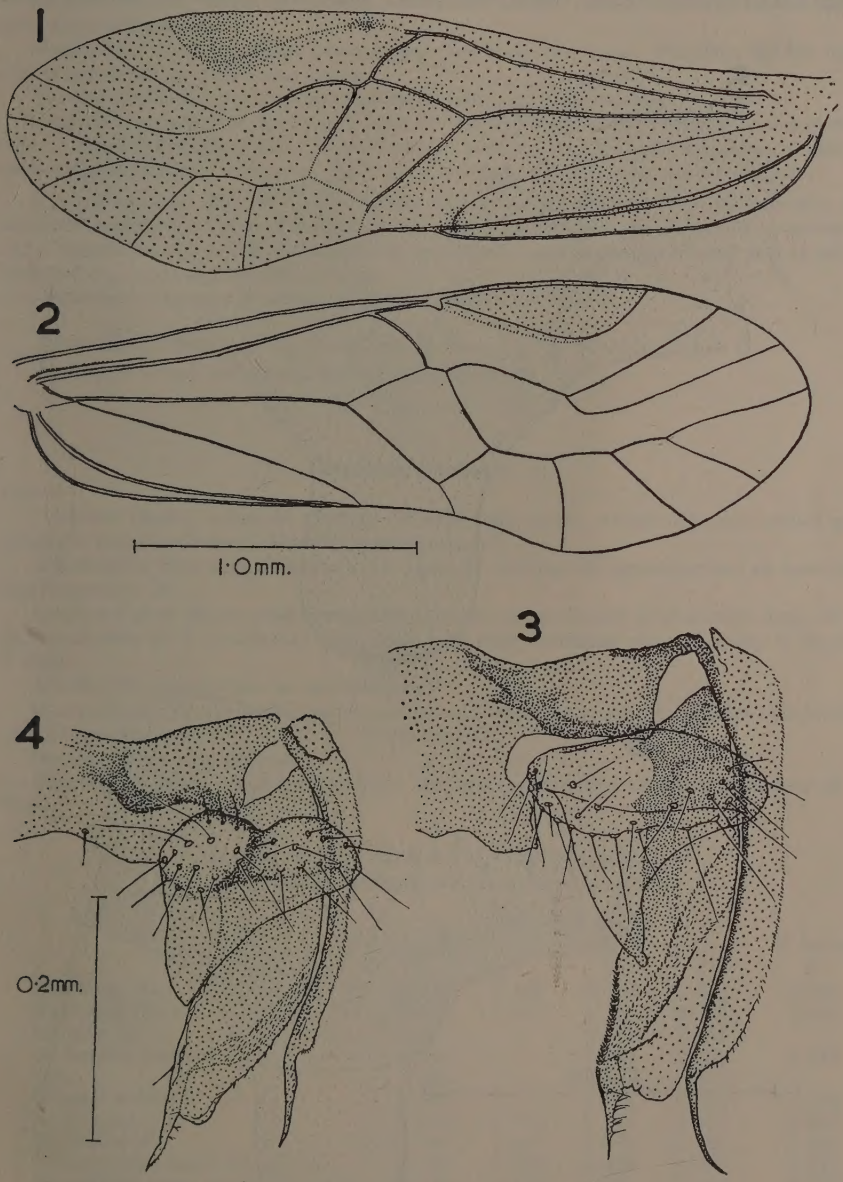
Coloration (in alcohol, freshly killed).—Ground colour of head pale whitish-yellow. Vertex with usual markings brown. Ocellar protuberance black, ocelli colourless. Postclypeus with striae fusing medially to form a brown band ; labrum brown. Genae pale whitish-yellow, unmarked. Eyes black. Maxillary palps whitish-yellow, last segment brown. Antennae with scape and pedicel pale brown, flagellum brown.

Thoracic terga brown, pleura paler. Legs : coxae, trochanters, femora white ; tibae pale brown, fore tibiae darkest ; tarsi brown, except first segment of hind tarsi pale brown. Wings : a wide, faint brown transverse band across proximal half of fore wing (fig. 1), light brown smoki-

ness in distal half of pterostigma, very faint brown cloudiness on veins *m* and cu_1, and on first section of *rr*. Hind wing hyaline.

Abdomen white, with uniform brown granulation dorsally.

Morphology.—Fore wing venation as figured (fig. 1). Number of ctenidiobothria on first hind tarsal joint: 20, 22 (2 specimens).

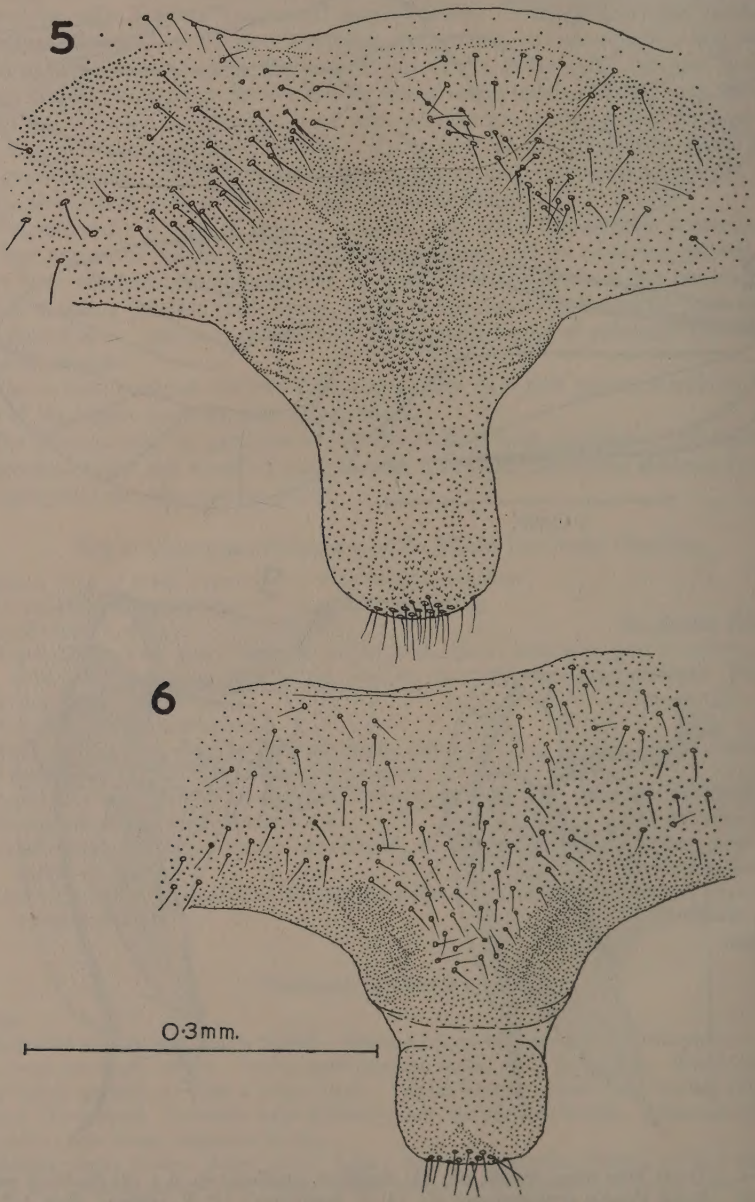


FIGS. 1–4.—(1)–(2) Fore wing, female, of: (1) *Neoblaste papillosus* sp. n.; (2) *Neoblaste setosus* sp. n. (3)–(4) Female gonapophyses of: (3) *N. papillosus*; (4) *N. setosus*. Figs. 1–2 and 3–4 have common scales.

Subgenital plate (fig. 5) with large, well-defined, bluntly rounded terminal lobe bearing a number of chitinous papillae posteriorly and about a score of long setae on posterior margin ; main body of plate with a roughly V-shaped field of chitinous papillae medially, and two anterolateral fields of setae.

A field of 24–27 trichobothria on each paraproct.

Gonapophyses (fig. 3) : ventral valve (first valvula) long, with a row of fine spines on its ventral edge and terminating in a long, curved, sharp point ; dorsal valve (second valvula) long, apically



Figs. 5–6.—Subgenital plate of : (5) *Neoblaste papillosus* ; (6) *N. setosus*. Common scale.

with a sharp point beset with fairly long spinelets on ventral edge, dorsal edge of valve just basal to apical point with a tract of very short spinelets ; outer valve (third valvula) bearing long setae and a long pointed posterior lobe.

Gonopore plate as in figure 10.

Dimensions.—Body length (in alcohol) : 2·7 mm. Dimensions of other characters as in Table I.

Male

Coloration (freshly killed, in alcohol).—As female except : antennae wholly brown, tibiae pale, wings unpigmented.

Morphology.—Eyes prominent, much larger than those of female. Flagellum thicker than that of female and its pubescence longer.

Number of ctenidiobothria on first hind tarsal joint : 19 (2 specimens).

Genitalia : hypandrium (fig. 7) with main sclerite setose and bluntly lobed at each posterior corner ; two pairs of symmetrical lateral accessory sclerites, the inner pair supporting a median anchor-shaped sclerite. Parameres (fig. 8) stout, symmetrical, free, with two apical hooks.

Apex of abdomen (fig. 11) : ninth tergite with sclerotised margin and shallow median indentation anteriorly ; epiproct marginally sclerotised except apically, sculptured in posterior half ; paraprocts with heavily sclerotised margin basally, well-developed circular field of 36–39 trichobothria, broad pointed lobe apically.

Dimensions.—Lengths of various characters are given in Table I.

HONG KONG ISLAND : on *Pinus massoniana*, xi, xii.57, rare, 2 ♂, 2 ♀.
Holotype ♀ and allotype ♂ in author's collection.

Neoblaste setosus sp. n.

Female

Coloration (freshly killed, in alcohol).—Wholly light cream, except eyes and ocellar protuberance very dark brown. Possibly recently emerged.

Morphology.—Fore wing venation as in figure 2. Number of ctenidiobothria on first hind tarsal segment : 19.

Subgenital plate (fig. 6) with terminal lobe shorter and somewhat more distinct from rest of plate than that of *N. papillosus* ; main plate with setae extending posteromedially in roughly V-shape.

A field of 25 trichobothria on each paraproct.

Gonapophyses (fig. 4) : ventral and dorsal valves of moderate length ; outer valve with bluntly pointed posterior lobe.

Gonopore plate as in figure 9.

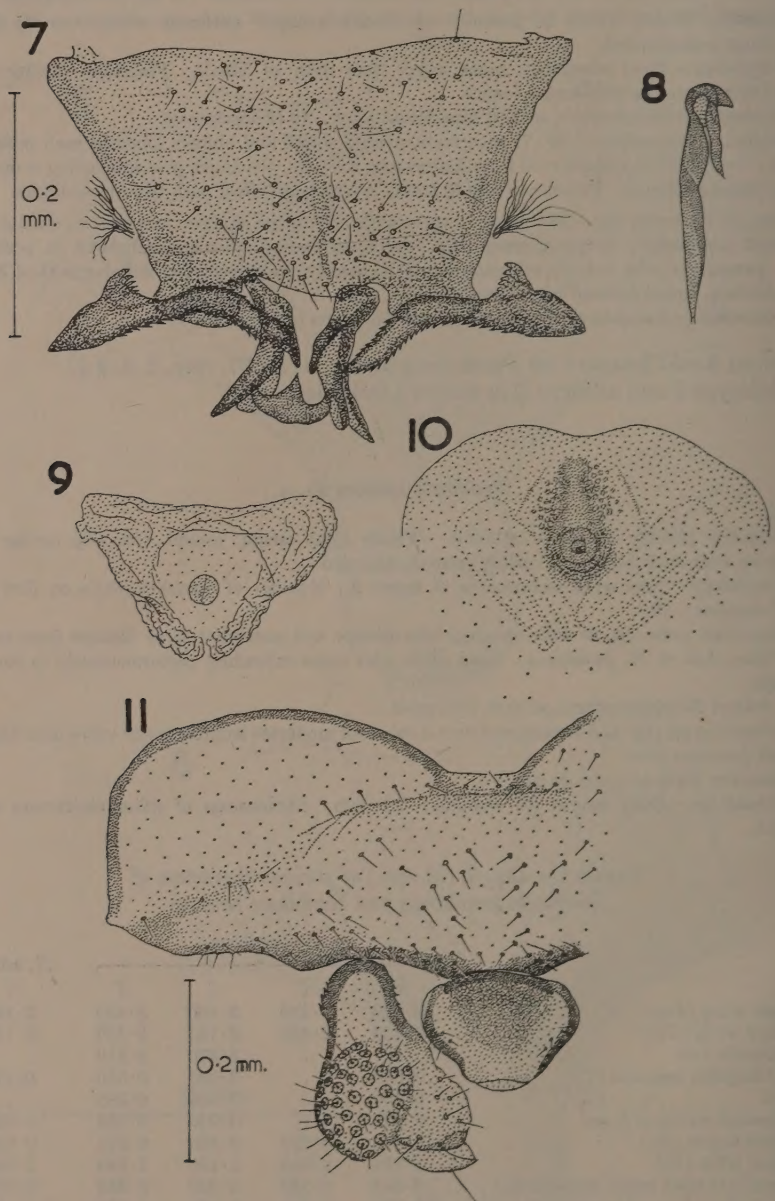
Dimensions.—Body length (in alcohol) : 2·5 mm. Dimensions of other characters as in Table I.

TABLE I.—*Length (in mm.) of various characters of* Neoblaste papillosus *and* Neoblaste setosus

	N. papillosus				*N. setosus*
	♀	♀	♂	♂	♀
Fore wing (*Fw*)	3·260	3·160	2·850	3·420	2·840
Hind wing (*Hw*)	2·470	2·420	2·110	2·550	2·130
Antenna (*A*)	.	.	2·270	2·810	.
1st flagellar segment (f_1)	0·540	.	0·495	0·550	0·410
2nd ,, ,, (f_2)	0·400	.	0·345	0·385	.
Greatest width of f_1 (*w*)	0·027	.	0·035	0·034	0·024
Hind femur (*Hf*)	0·640	0·625	0·560	0·575	0·630
Hind tibia (*Ht*)	1·210	1·240	1·180	1·180	1·180
Proximal hind tarsal segment (t_1)	0·355	0·330	0·340	0·330	0·330
Second hind tarsal segment (t_2)	0·136	0·128	0·120	0·128	0·122
Ratio f_1/f_2	1·34	.	1·43	1·43	.
Ratio t_1/t_2	2·61	2·58	2·83	2·58	2·70

Hong Kong Island : on cultivated shrubs, ix.57, rare, only one female. Holotype ♀ in author's collection.

The females of *N. papillosus* and *N. setosus* are separable on the chaetotaxy of the subgenital plate. The extreme lateral accessory sclerites of the hypandrium of *N. papillosus* could conceivably have been derived from the lateral projections of the



Figs. 7–11.—(7) *Neoblaste papillosus*, hypandrium ; (8) the same, paramere. (9) *N. setosus*, gonopore of female. (10) *N. papillosus*, gonopore of female. (11) *N. papillosus*, apex of male abdomen. Figs. 7–10 common scale.

hypandrium of *Blaste angolensis* Bad., 1955, and their serrated margins recall similarly situated sclerotisations of the hypandrium of *Blastopsocidus maculatus* Bad., 1955. The number and variety of these accessory sclerites, however, is unprecedented in the Amphigerontiinae, and the two Hong Kong species must be relatively distantly related to other known groups.

Ptycta incurvata sp. n.

Female

Coloration (freshly killed, in alcohol).—Head generally cream with brown markings. Vertex with usual markings. Frons with two posterolateral brown bands, a U-shaped mark anteromedially and vague brown clouds lateral to this. Ocellar protuberance black, ocelli pale. Anteclypeus white; postclypeus cream with brown striae; labrum brown with white pubescence. Genae pale cream, a brown square patch below and touching orbit, antennal socket bordered dark brown. Eyes grey, turning black with storage. Maxillary palps light brown, last segment brown shading to dark brown distally. Antennae with scape pale brown, pedicel pale cream, first flagellar segment pale brown shading to dark brown distally, rest of flagellum dark brown.

Mesothorax: antedorsum brown fading to pale cream posteriorly, posterior apex brown; dorsal lobes brown widely bordered with pale cream anteriorly; scutellum paler brown, edged with dark brown anteriorly and laterally. Metathorax: antedorsum pale brown; dorsal lobes brown; scutellum pale edged with dark brown laterally. Thoracic pleura brown. Legs: coxae brown, fading to white distally; trochanters white; femora white, brown distally; tibiae white, setae sited on dark spots, dark brown at distal tip; tarsi brown. Wings: fore wing (fig. 12) with brown markings, hind wing hyaline.

Abdomen pale whitish-cream with broad transverse faint greyish-brown bands, faint brown spots laterally; ninth tergite brown, epiproct and paraprocts white.

Morphology.—Labrum and labial palps strongly pubescent. IO : D[1] (Pearman, 1934) = 1·9 : 1.

Fore wing (fig. 12) with outer margin bearing a few small fine hairs, *rr* and *m* fused for a short distance (27 specimens), with or without cross-vein stump on pterostigma. Hind wing with four or five fine hairs on margin between branches of radial fork. Number of ctenidiobothria on first hind tarsal segment: 21–27 (27 specimens, average 23).

Subgenital plate (fig. 18) having truncate apical lobe not sharply marked off from rest of plate, with heavily sclerotised wedge-shaped area posteromedially, on apical margin on either side of mid-line a long stout seta, lateral to this one or two rows of shorter less stout setae. Central area of apical lobe with short setae, immediately anterior to these a pair of long stout setae. Main body of plate setose, with a broadly Y-shaped pattern of pigmentation.

A field of 23–24 trichobothria on each paraproct.

Gonapophyses (fig. 13): ventral valve styliform; dorsal valve lobate, progressively acuminate with long slender pointed apex, heavily sclerotised bars basally; outer valve with short posterior lobe, long stout setae mixed with small setae.

Gonopore plate as figured (fig. 14).

Dimensions.—Body length (in alcohol): 3·2 mm. Dimensions of other characters as in Table II*a*. Coefficients of variability range from 3·4 (ratio t_1/t_2) to 7·1 (width of first flagellar segment).

Male

Coloration (freshly killed, in alcohol).—As female.

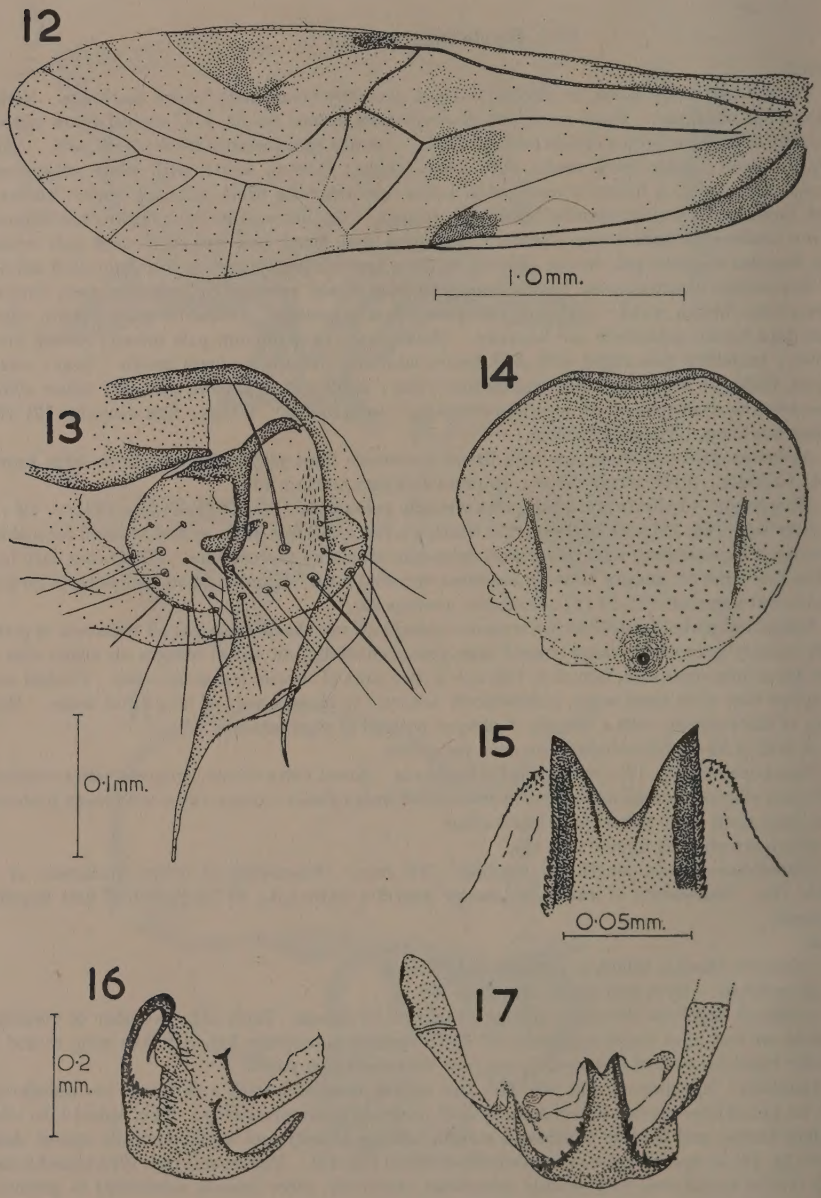
Morphology.—Eyes prominent, IO : D = 0·8 : 1.

Antennal flagellum decidedly thicker than that of female (Table II). Number of ctenidiobothria on first hind tarsal segment: 22–25 (8 specimens, average 24). In fore wing *rr* and *m* usually fused for a short distance, in one case they meet at a point.

Genitalia: hypandrium (fig. 16) with two lateral lobes each with a chitinous bar anteriorly, and an apical lobe curved anterodorsally and recurved posteroventrally. This apical lobe with median furrow and heavily sclerotised margin bearing basally and asymmetrically sparse stout teeth (fig. 17), in apical region margin closely serrated (fig. 15). Phallosome (fig. 19) a closed frame with lateral apophyses, very weakly sclerotised anteriorly, more heavily sclerotised in posterior half which bears an apical projection covered with sharp spinelets.

[1] Ratio between the interocular space and the apparent eye-diameter as seen from the front of the head.

Apex of abdomen (fig. 20): a corrugated bow-like structure between epiproct and ninth tergite, and lateral sclerotised bars supporting unsclerotised epiproct; paraprocts with a rounded setose apical lobe and adjacent peg-like structure bearing a long seta, a large peg-like projection basolaterally, and a field of 32 trichobothria.

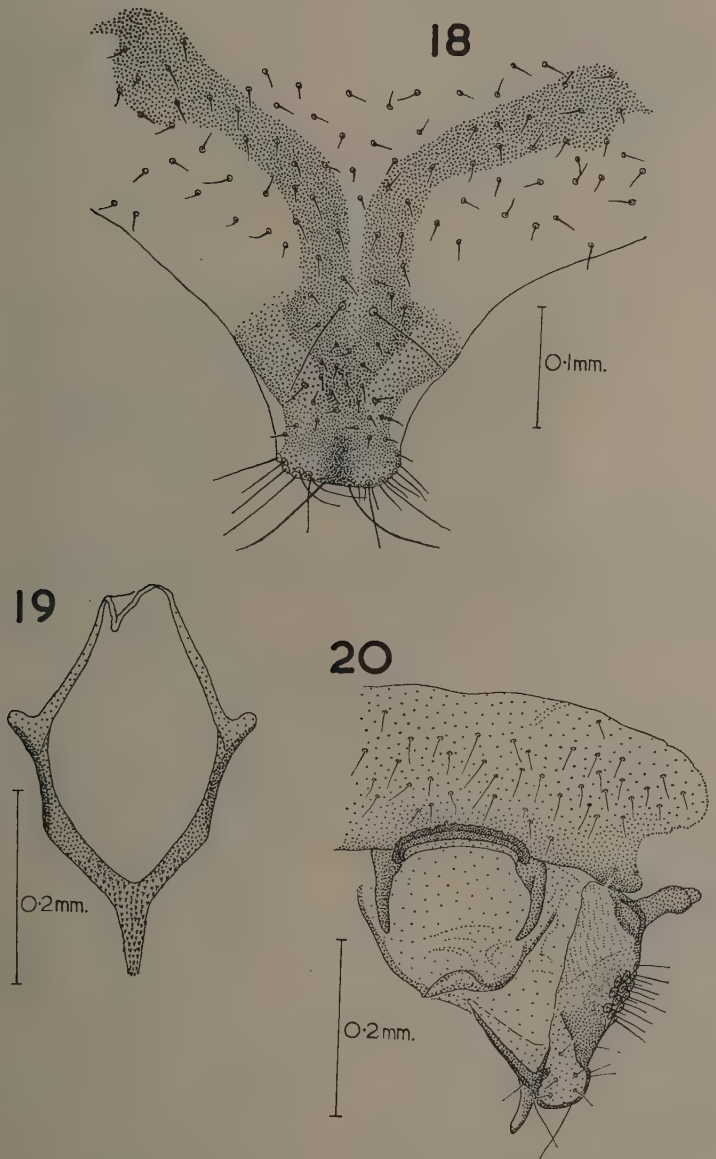


Figs. 12–17.—*Ptycta incurvata* sp. n.: (12) fore wing of female; (13) female gonapophyses; (14) gonopore; (15) apex of hypandrium; (16) hypandrium, lateral view; (17) the same posterior view. Figs. 13–14 and 16–17 have common scales.

Dimensions.—Body length (in alcohol): 2·6 mm. Dimensions of various characters as in Table II*b*. Coefficients of variability range from 3·3 (t_2 and ratio f_1/f_2) to 7·4 (*Fw*).

Hong Kong Island: on *Pinus massoniana*, ix, xi, xii.57, iv, xii.58, xi, xii.59, iii.60, frequent.

Holotype ♀ and allotype ♂ in author's collection. Male and female paratypes will be placed in the British Museum (Nat. Hist.).



Figs. 18–20.—*Ptycta incurvata*: (18) subgenital plate; (19) phallosome; (20) male, apex of abdomen.

Mr. J. V. Pearman has pointed out to me that although practically the genera *Ptycta* End., 1925 and *Maheella* End., 1931 may differ, theoretically they are synonymous. He is shortly to look into this problem with a view to clearing up the anomaly.

Roesler (1944) distinguishes the two genera on the fact that *Ptycta* has the outer edge of the fore wing and the tip of the hind wing finely haired, while in *Maheella* the fore wing is bare. On this criterion, the present species belongs to *Ptycta*, to which I have provisionally assigned it, although it may possibly represent a third genus.

TABLE II.—*Length of various characters of* Ptycta incurvata

	(*a*) FEMALE			(*b*) MALE		
Character	Number of specimens measured	Range (mm.)	Mean ± Standard deviation (mm.)	Number of specimens measured	Range (mm.)	Mean ± Standard deviation (mm.)
Fw	27	3·320–4·000	3·687±0·190	7	3·320–3·940	3·584±0·264
Hw	27	2·580–3·130	2·865±0·157	7	2·580–3·060	2·823±0·189
A	17	3·160–3·640	3·410±0·155	3	3·420–3·680	3·510±0·144
f_1	25	0·685–0·815	0·750±0·036	8	0·705–0·815	0·759±0·046
f_2	25	0·595–0·760	0·662±0·041	8	0·630–0·690	0·656±0·023
w	25	0·030–0·039	0·036±0·003	8	0·041–0·049	0·043±0·003
Hf	27	0·705–0·825	0·769±0·030	8	0·705–0·805	0·753±0·036
Ht	27	1·440–1·690	1·589±0·072	8	1·440–1·720	1·563±0·091
t_1	27	0·430–0·495	0·463±0·017	8	0·430–0·505	0·479±0·027
t_2	26	0·169–0·200	0·182±0·007	8	0·177–0·190	0·180±0·006
Ratio f_1/f_2	25	1·04–1·27	1·136±0·054	8	1·09–1·20	1·156±0·038
Ratio t_1/t_2	26	2·35–2·70	2·509±0·086	8	2·40–2·77	2·636±0·131

In female genitalia *P. incurvata* is closest to *Maheella tachardiae* Bad., 1935 (in the figure of which the lateral valve is apparently turned round), but the male genitalia are peculiar, showing certain similarities with two undescribed species in Pearman's collection from Australia and Réunion.

Psococerastis sinensis sp. n.

Female

Coloration (freshly killed in alcohol).—Head generally pale cream, markings sepia. Vertex, frons and postclypeus with the usual markings. Ocellar protuberance dark brown. Anteclypeus and labrum brown. Genae pale cream, a well-defined brown band from lower margin of orbit to antennal socket, this latter bordered brown. First segment of labial palp colourless, second faint greyish-brown. Eyes dark brown. Maxillary palps with first three segments brown, last segment very dark brown. Antennae with scape and pedicel brown, first flagellar segment very pale, not darkening distally, rest of flagellum brown.

Mesothorax: antedorsum cream, no median paler band; dorsa pale with brown pigmentation extending from posterior margin anterolaterally up to about half-way along the dorsa, thin line of brown on anterior margins; scutellum pale. Metathorax: antedorsum pale, median suture dark; dorsa pale, anterior, posterior and outer margins brown; scutellum pale. Thoracic pleura brown. Legs: coxae brown, trochanters colourless; femora pale cream with encircling brown band one-quarter length from distal end, femora of first and second pair of legs also have a brown mark on inner side one-third length from proximal end; tibiae pale brown, dark brown at distal end; first tarsal segment light brown darkening distally, second segment brown. Wings: fore wing (fig. 21) marked with brown, parts of veins (dotted in figure) whitish by reflected light, as also is pterostigma, particularly marginally and proximally.

Abdomen dorsally pale cream with greyish-brown markings (fig. 23), ventrally with diffuse greyish-brown pigment, an ill-defined darker line on posterior edge of each sternite.

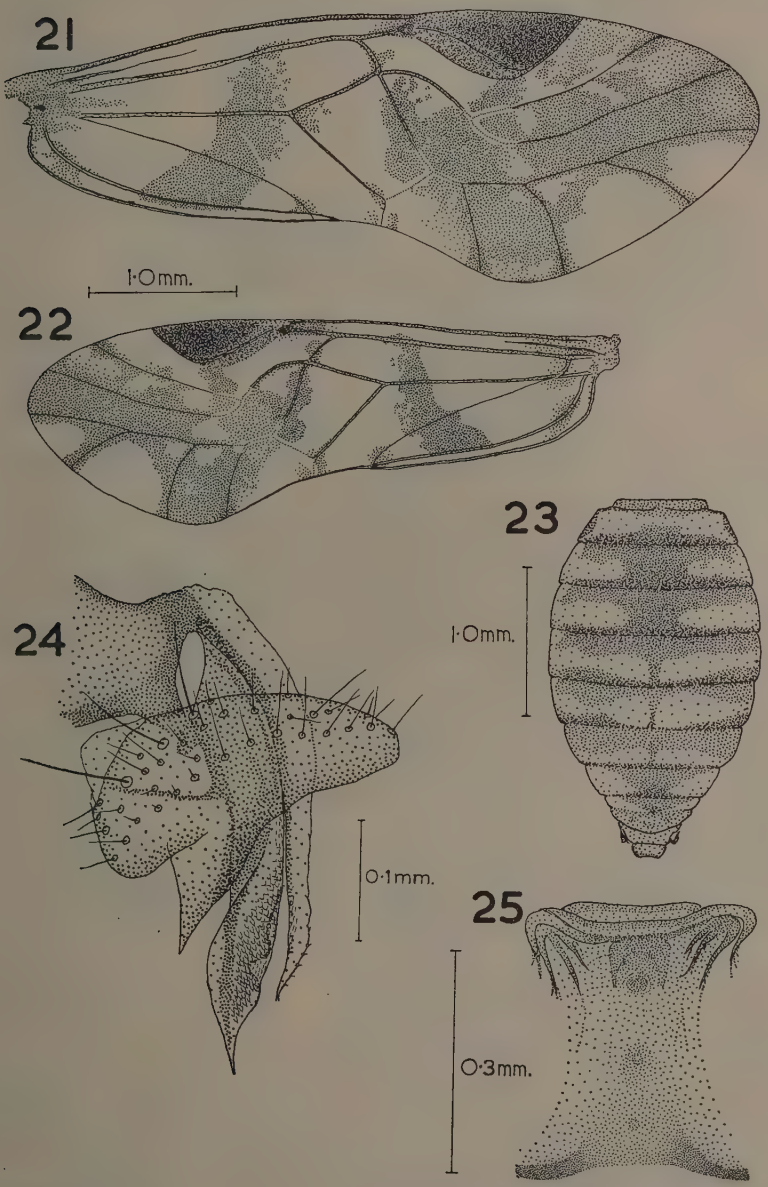
Morphology.—Venation of fore wing as figured. Number of ctenidiobothria on first segment of hind tarsus: 25.

Subgenital plate (fig. 26) with apical lobe beset with long setae on posterior margin, shorter

setae immediately anterior to these. Main body of plate setose, a row of longer setae just posterior to main transverse pigmented area.

A field of 39 trichobothria on each paraproct.

Gonapophyses (fig. 24) : ventral valve styliform with sparse short fine hairs apically ; dorsal



FIGS. 21–25.—*Psococerastis sinensis* sp. n. : (21) fore wing of female ; (22) fore wing of male ; (23) abdomen of female, dorsal aspect ; (24) female gonapophyses ; (25) gonopore plate. Figs. 21–22 have common scale.

valve twisted, with a dense field of papillae apically ; outer valve with long and short setae and three prominent very long setae, with a pointed posterior lobe.

Gonopore plate (fig. 25) : very large, complex.

Dimensions.—Body length (in alcohol) : 4·6 mm. Dimensions of other characters as in Table III.

TABLE III.—*Length (in mm.) of various characters of one female and three males of* Psococerastis sinensis

	Female	Male		
Fw	5·050	3·710	3·970	3·640
Hw	3·660	2·810	2·940	.
A	.	.	.	.
f_1	1·390	1·335	1·170	1·170
f_2	1·265	1·140	.	1·300
w	0·046	0·046	0·045	0·044
Hf	1·090	0·795	0·860	0·750
Ht	2·140	1·630	1·690	1·460
t_1	0·560	0·430	0·485	0·395
t_2	0·264	0·212	0·231	0·204
Ratio f_1/f_2	1·10	0·94	.	0·90
Ratio t_1/t_2	2·12	2·03	2·10	1·94

Male

Coloration (freshly killed, in alcohol).—As female, with the following exceptions :

Head markings, anteclypeus and labrum light brown. First flagellar segment pale brown, darkening distally.

Mesothorax : antedorsum dark brown, its longitudinal suture and posterior margin bordered pale cream ; dorsa pale cream with dark brown along anterior, posterior and median margins. Metathorax : dorsa dark brown with pale cream circular area in middle of each ; anterior suture of scutellum very dark brown. Femora of first two pairs of legs cream with two brown transverse bands, light brown on outer surface ; femora of hind legs very pale cream with one brown band ; tarsi of first two pairs of legs with both segments brown. Fore wing pigmented as in figure 22.

Abdomen ventrally greyish-brown, pigment covering nearly all of each sclerite, sutures cream. Hypandrium very dark brown.

Morphology.—Eyes not very prominent, only slightly relatively larger than those of female.

Number of ctenidiobothria on first hind tarsal segment : two specimens 21, one specimen 23.

Genitalia : hypandrium (fig. 29) apically bilobed, each lobe ending in close set teeth, a tract of spines on right lobe, no such tract on left ; median furrow with asymmetrical sclerotised and unsclerotised bands. Phallosome (fig. 27) a stout closed frame, well sclerotised, with a " notch " posteriorly, a small pointed projection anteriorly.

Apex of abdomen (fig. 28) : ninth tergite lobed medially, its posterior margin with well-sclerotised rim. Epiproct truncate, bearing four long and numerous small setae. Paraprocts with a stout basal supporting bar, a subapical large spine, and a field of 35 trichobothria.

Dimensions.—Body length (in alcohol) : 3·8 mm. Dimensions of other characters as in Table III. Generally of smaller size than female, as is usual in the genus.

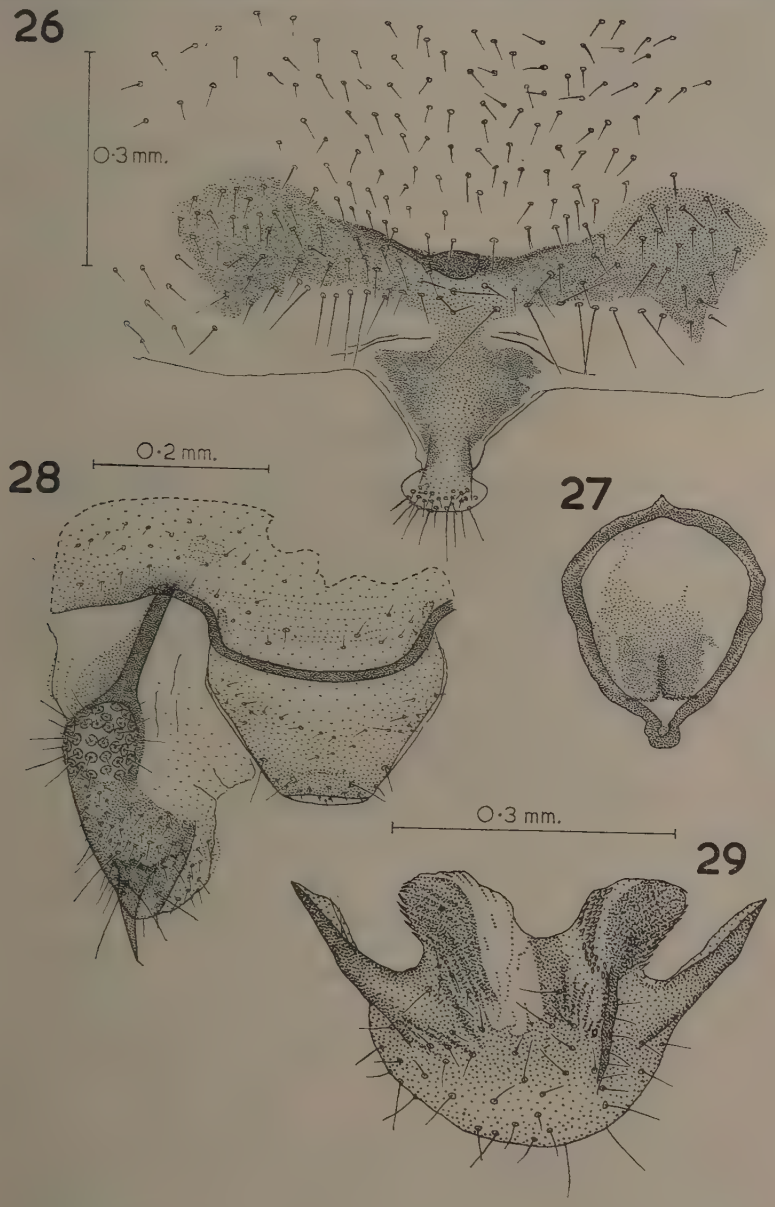
HONG KONG ISLAND : xi.57, v.58, rare. The single female taken by N. Krauss at above 500 m.

Holotype ♀ and allotype ♂ in author's collection.

A series of species related to *Psocus taprobanes* Hagen, 1858, have been described under *Psocus* from the oriental region, which, on wing markings, appear to be related to the African group of species assigned to *Psococerastis* Pearman. The present species, on wing markings, falls within this oriental series (no genitalic details of the species have been published), but differs from any species so far described.

I have seen a male cotype of *P. taprobanes*, which has a much larger fore wing with the proximal transverse band extending into the discoidal cell. Enderlein (1903) redescribes the variety of *P. taprobanes cosmopterus* McLach., 1866, and gives the

male fore wing length as 4·5 mm. His figure shows cell *Rs* fully pigmented, and the transverse band widening anteriorly. This variety is also figured by Ribaga (1908), showing the transverse band narrowing anteriorly, but cell *Rs* more completely pigmented than the present species. I have seen cotypes of this variety in the British Museum (Nat. Hist.), and besides the fore wing being larger than 6 mm. even in the male, the pattern of pigmentation bears little relation to Enderlein's figure, being



FIGS. 26–29.—*Psococerastis sinensis:* (26) subgenital plate; (27) phallosome; (28) male, apex of abdomen; (29) hypandrium. Figs. 26–27 have common scale.

much closer to that of Ribaga. Kolbe's variety *bengalensis* (Kolbe, 1883*b*) is shown by Enderlein (1903) with very extensive pigmentation of the fore wing. This variety is smaller than *P. sinensis*. The variety *flavistigma* Kolbe, 1885, is larger than *P. sinensis* and has a yellow pterostigma and more extensive pigmentation of the fore wing.

Psocus tokyoensis End., 1906 and *Psocus kurokianus* End., 1906, from Japan and Manchuria respectively, have a fore wing pattern basically similar to that of the *taprobanes* series and *P. sinensis*. Both are larger than *P. sinensis* (Okamoto, 1907), and *P. tokyoensis* has much less extensive pigmentation of the fore wing, the second radial cell being almost completely hyaline.

Psocus discalis Navas, 1921, from Tonkin, has the fore wing pigmentation disposed in three fairly obvious bands, while *Psocus joannsi* Navas, 1934, also from Tonkin, and probably congeneric with all the above, has the proximal transverse band very broken up. I have examined specimens of both species in the Muséum National d'Histoire Naturelle, Paris.

P. sinensis is remarkably similar in female genitalia to *Psococerastis thomasseti* Pearman, 1934, from Natal, while the male genitalia do not strictly conform to any of the African series. Mr. Pearman has kindly sent me drawings of a species provisionally determined as *P. flavistigma*, the subgenital plate of which is less like that of *P. sinensis* than is that of *P. thomasseti*, although the male hypandrium is quite similar to that of *P. sinensis*.

Psocidus validus sp. n.

Male

Coloration (freshly killed, in alcohol).—Head generally pale cream, markings brown. Vertex with distinct brown markings. Median epicranial suture very dark brown. Frons with a median circular brown mark, with two oblique lateral brown bands arising from its anterior edge. Ocelli pale, bordered very dark brown. Anteclypeus dark brown; postclypeus pale cream with striae of brown spots leaving two small circular areas of pale cream near anterior border; labrum dark brown. Genae white, a thin brown band round ventral margin of orbit, a large subquadrangular brown patch near anterior edge of gena. Eyes grey. Maxillary palps with first three segments faint brown, white distally; last segment dark brown. Antennae with scape white basally, brown in distal half, pedicel brown, flagellum very dark brown.

Mesothorax: antedorsum dark brown, border of median suture and posterior apex light cream; dorsal lobes brown, bordered with light cream; scutellum pale, anterior suture dark brown. Metathorax: antedorsum light greyish-brown; dorsal lobes pale cream, a brown circular area posteromedially, a larger brown area anterolaterally; scutellum pale cream, anterior suture dark brown. Thoracic pleura dark brown, mesothoracic episternum and epimere bordered with white posteriorly. Legs: coxae brown, fading to colourless distally; trochanters white; femora white, faint greyish band subdistally; tibiae of first pair of legs mottled faint greyish, other tibiae faint brown, white at proximal end; tarsi dark brown. Wings: fore wings (fig. 30) hyaline, pigmentation of pterostigma variable, sometimes absent, whole area of pterostigma silvery, its veins white by reflected light; hind wings hyaline.

Abdomen dorsally yellow, a wide transverse dark brown band covering posterior half of first two and anterior part of third tergites, narrower bands on anterior half of succeeding tergites, widening and becoming confluent medially, dorsolaterally and laterally, giving appearance of five longitudinal bands. Abdomen ventrally pale cream, very narrow brown bands on anterior borders of sterna, disappearing medially.

Morphology.—IO : D = 2·0 : 1. Flagellum thick. Number of ctenidiobothria on first hind tarsal segment: 19–24 (18 specimens, average 21). In all specimens examined, in fore wing *rr* and *m* fuse for a short distance.

Genitalia: hypandrium (fig. 33) with setose apical lobe, a pair of sculptured lobes just posterior to this, and a pair of well-sclerotised projections more posteriorly; setose posteriorly and medially; a broadly V-shaped pattern of sclerotisation, with two sclerotised islands anterior to the arms of the V. Phallosome (fig. 34) with outer arms bearing pointed lateral apophyses, inner arms well sclerotised.

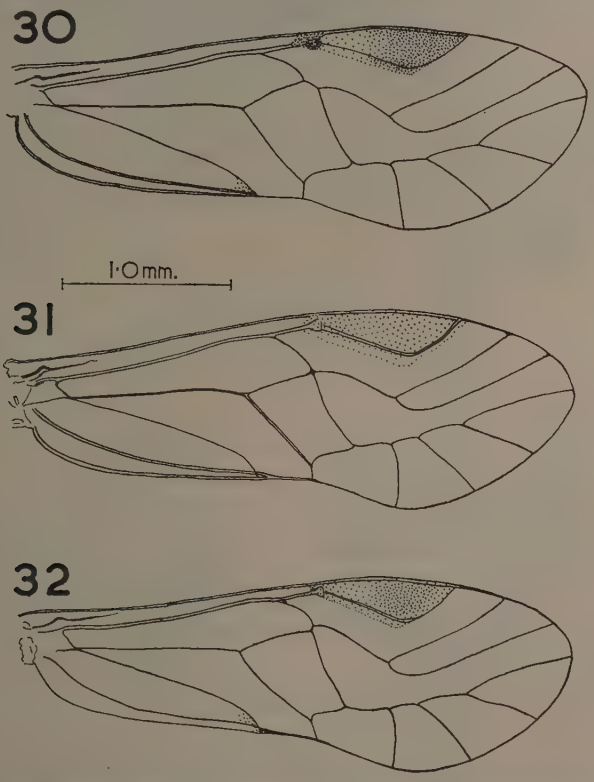
Apex of abdomen (fig. 37): ninth tergite with two large pointed projections directed

TABLE IV.—*Length of various characters of* Psocidus validus

Character	(a) Male: Number of specimens	(a) Male: Range (mm.)	(a) Male: Mean ± Standard deviation (mm.)	(b) Female: Number of specimens	(b) Female: Range (mm.)	(b) Female: Mean ± Standard deviation (mm.)
Fw	17	2·930–3·640	3·197±0·165	26	3·000–3·680	3·384±0·154
Hw	15	2·180–2·680	2·374±0·116	25	2·260–2·740	2·509±0·119
A	9	2·710–3·420	2·926±0·262	14	2·580–2·970	2·752±0·116
f_1	18	0·540–0·740	0·629±0·057	25	0·540–0·700	0·613±0·040
f_2	17	0·415–0·615	0·498±0·056	23	0·440–0·585	0·501±0·041
w	18	0·035–0·046	0·041±0·003	25	0·027–0·035	0·031±0·002
Hf	17	0·560–0·695	0·624±0·034	25	0·630–0·710	0·669±0·008
Ht	18	1·180–1·410	1·304±0·072	25	1·300–1·420	1·361±0·036
t_1	18	0·330–0·410	0·372±0·024	25	0·330–0·425	0·378±0·022
t_2	18	0·131–0·155	0·144±0·007	23	0·144–0·169	0·154±0·006
Ratio f_1/f_2	17	1·20–1·37	1·265±0·054	23	1·11–1·37	1·223±0·076
Ratio t_1/t_2	18	2·22–2·92	2·556±0·190	23	2·25–2·74	2·441±0·129

posteriorly over triangular setose epiproct. Paraprocts basally with small sclerotised projection; distally with large broad hook bearing two very long and several shorter setae and a short sharp spine; trichobothrial field divided, a basal group of ten, and a more distal group of about fifteen trichobothria.

Dimensions.—Body length (in alcohol): 2·6 mm. Dimensions of other characters (Table IV*a*) have coefficients of variability ranging from 4·3 (ratio f_1/f_2) to 11·3 (f_2).



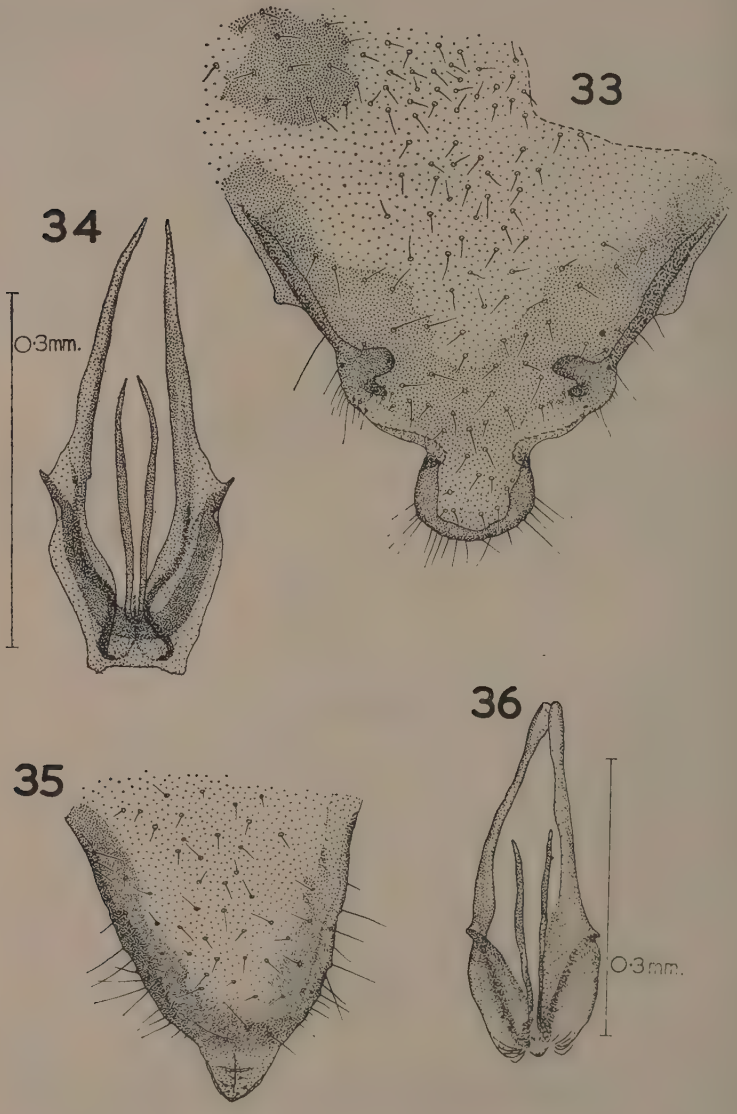
FIGS. 30–32.—(30) *Psocidus validus* sp. n., fore wing of male; (31) the same, fore wing of female. (32) *Psocidus strictus* sp. n., fore wing of male. Common scale.

Female

Coloration (freshly killed, in alcohol).—As male, with following exceptions : genae pale cream, a diffuse brown band or sometimes a distinct dark brown mark round ventral margin of orbit, light brown patch just posterior to antennal sockets. Abdominal markings widen medially, dorsolaterally and laterally, but become confluent only laterally.

Morphology.—IO : D. = 2·6 : 1. Eyes almost as large as in male.

Number of ctenidiobothria on first hind tarsal segment : 18–24 (26 specimens, average 21).



Figs. 33–36.—(33) *Psocidus validus*, hypandrium ; (34) the same, phallosome. (35) *P. strictus*, hypandrium ; (36) the same, phallosome. Figs. 33–34 and 35–36 have common scales.

Fore wing (fig. 31): in 15 specimens *rr* and *m* fuse for a short distance, in 4 they are joined by a cross-vein and in 7 they meet in a point.

Subgenital plate (fig. 39) with truncate apical lobe bearing about 16 long setae on posterior margin and several very small setae on sclerotised part of lobe, rest of plate setose, two lateral wedge-shaped sclerotised areas.

Two fields of 8–10 and 11–12 trichobothria on each paraproct.

Gonapophyses (fig. 40); ventral valve lobed subdistally, styliform distally with fine recurved spines; dorsal valve progressively acuminate with a few small fine spines on the apex directed posteriorly; outer valve setose.

Gonopore plate (fig. 41).

Dimensions.—Body length (in alcohol): 3·0 mm. Dimensions of other characters (Table IV*b*) have coefficients of variability ranging from 1·2 (*Hf*) to 8·2 (f_2).

Hong Kong Island: on *Pinus massoniana*, xii.57, ii, iv, xii.58, frequent.

Holotype ♂ and allotype ♀ in author's collection. Male and female paratypes will be deposited in the British Museum (Nat. Hist.).

Psocidus strictus sp. n.

Male

Coloration (freshly killed, in alcohol).—Head generally very pale cream. Vertex with faint grey-brown markings, median suture very dark brown. Frons with a median grey-brown circular band with two lateral oblique bands arising from anterior edge of circle. Ocelli pale, heavily bordered dark brown internally. Postclypeus with striae faint, darker medially; labrum brown. Genae pale, a faint brown mark from orbit to antennal socket. Eyes grey. Maxillary palps with first three segments pale, last segment brown. Scape and pedicel of antennae pale, flagellum brown basally, fading to very pale brown distally.

Mesothorax: antedorsum brown anteriorly, pale cream medially and posteriorly; dorsal lobes brown, bordered pale cream, posterior sutures very dark brown; scutellum pale cream.

Table V.—*Length (in mm.) of various characters of two males of* Psocidus strictus

Fw	3·230	3·260
Hw	2·420	2·420
A	.	3·370
f_1	0·705	0·685
f_2	0·595	0·575
w	0·036	0·036
Hf	0·625	0·610
Ht	1·300	1·300
t_1	0·370	0·365
t_2	0·147	0·144
Ratio f_1/f_2	1·18	1·19
Ratio t_1/t_2	2·52	2·54

Metathorax: antedorsum pale cream; dorsal lobes brown anteriorly fading to cream posteriorly; scutellum pale, anterior sutures brown. Legs: coxae brown, fading to colourless distally; trochanters, femora and tibiae colourless; tarsi light brown. Thoracic pleura brown, sutures dark. Wings: fore wing with stigmasac and distal half of pterostigma brown pigmented, hind wing hyaline.

Abdomen pale cream with diffuse brown granulations.

Morphology.—Eyes large, prominent; IO : D = 0·7 : 1. Flagellum thin.

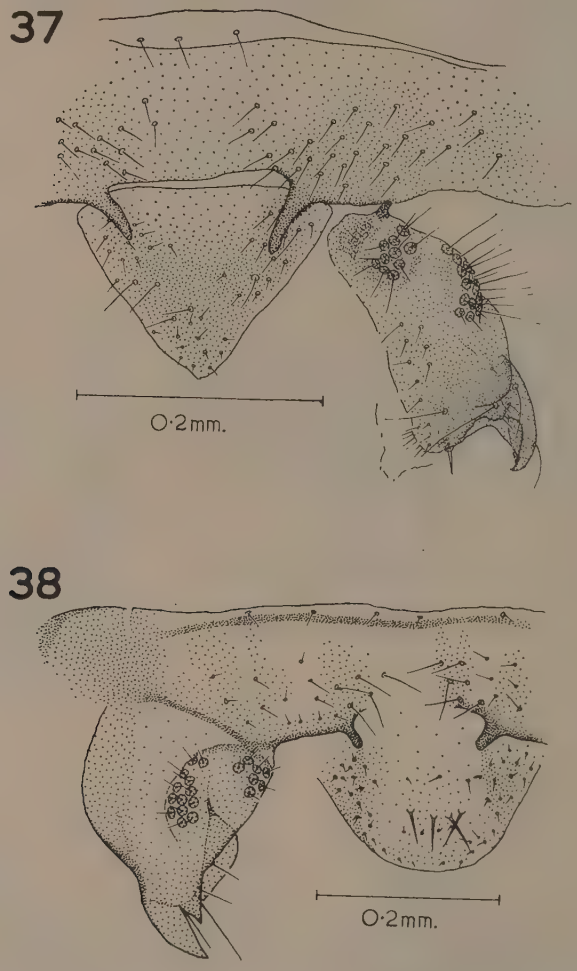
In one specimen *rr* and *m* in fore wing fuse for a certain distance, in the other they are joined by a cross-vein (fig. 32). Number of ctenidiobothria on first hind tarsal segment: 20, 21 (2 specimens).

Genitalia: hypandrium (fig. 35) with an unsclerotised apical lobe bearing about six very small setae, with a broadly U-shaped pattern of sclerotisation, setose. Phallosome (fig. 36) with outer arms blunt at anterior ends and with small blunt lateral apophyses, inner arms well sclerotised.

Apex of abdomen (fig. 38): ninth tergite with sclerotised posterior border and short blunt

projections directed posteriorly over epiproct; epiproct lightly sclerotised, rounded posteriorly, with very small fine setae laterally and on hind border, four large stout spines in a transverse row centrally; paraprocts bare except for four long setae in apical half, a large wide hook apically, trichobothrial field divided, six trichobothria in a basal group, thirteen in a more distal group.

Dimensions.—Body length (in alcohol): 2·6 mm. Dimensions of various characters as in Table V.



Figs. 37–38.—Apex of abdomen, male: (37) *Psocidus validus*; (38) *P. strictus*.

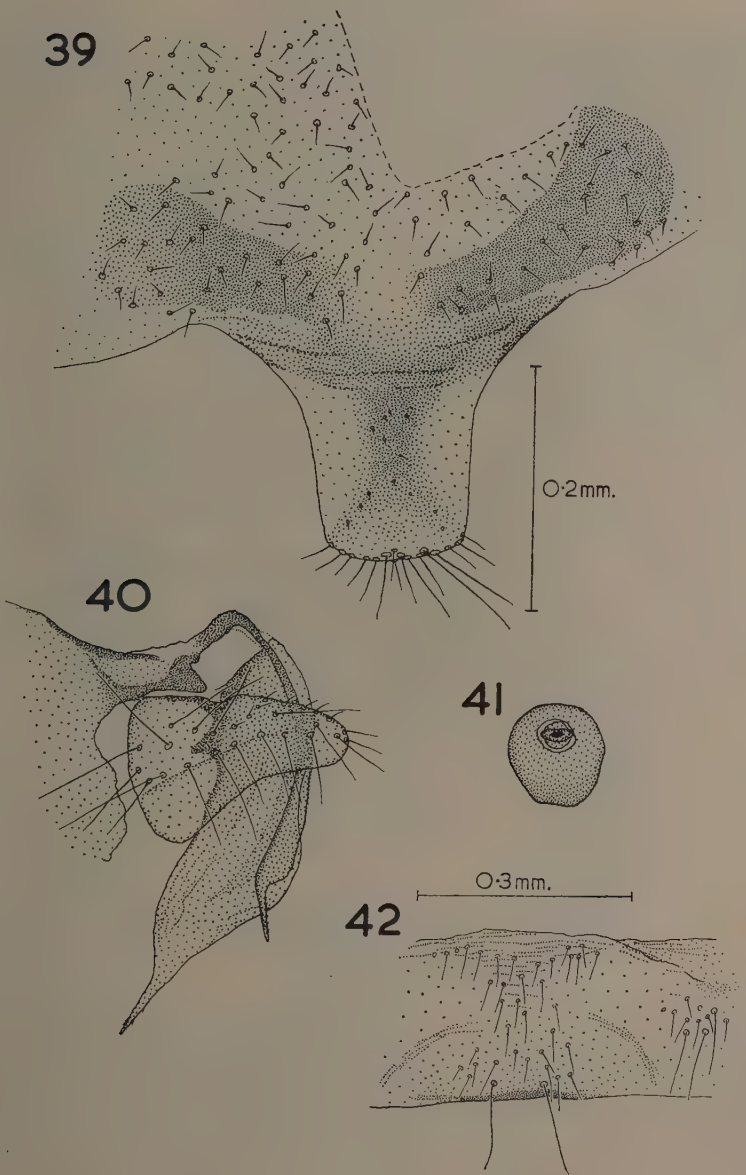
Hong Kong Island: on *Pinus massoniana*, xii.57, two specimens.

Holotype ♂ in author's collection.

In 1934, Pearman created an "omnibus" genus, *Psocidus*, for all species of *Psocus* (sensu Hagen) which could not be definitely ranked in any subsequently erected genus. *Psocidus zanzibarensis* Pearman, 1934, was taken as the type species. On venation and male genitalia the present species are closely allied to *P. zanzibarensis* and undoubtedly congeneric with it. The hypandrium and phallosome of *P. strictus* and *P. validus* are closely in conformity with those of the type species,

as are the male paraprocts, each with two trichobothrial fields. The Hong Kong species here described therefore belong to *Psocidus* sensu strictu. Other incongruous but incompletely known species, which still remain, must for the time being be left in the genus *sensu latu*. It is hoped to make provision for these at a later date.

The Hong Kong species differ from *P. zanzibarensis* and resemble each other in



FIGS. 39–42.—(39)–(41) (common scale) *Psocidus validus :* (39) subgenital plate ; (40) female gonapophyses ; (41) gonopore plate. (42) *Myopsocus elongatus* sp. n., hypandrium.

possessing two peg-like projections of the ninth tergite which overlap the epiproct. The males can be readily distinguished by the relative size of the eyes and thickness of the flagellum.

III. Myopsocidae

Myopsocus elongatus sp. n.

Male

Coloration (freshly killed, in alcohol).—Head generally pale yellowish-cream. Vertex with large brown spots posteriorly, fusing into an irregular shape, more anteriorly smaller spots tending to form longitudinal lines, anterior border edged with dark brown. Frons with three pairs of curved dark brown lines, one pair median, two lateral, each pair enclosing a longitudinal oval pale yellowish area. Ocelli pale, internally bordered dark brown. Anteclypeus unmarked; postclypeus with small dark brown marks, denser medially and laterally, tending to form striae; labrum unmarked. Genae with wide brown border on anterior and posterior margins, a narrow dark brown stripe from below orbit to antennal socket, another from anterior edge of orbit to above antennal socket. Eyes black. Maxillary palps brown, second and third segments ringed with white distally, fourth segment very dark brown. Antennae with scape ringed with brown distally, pedicel marked with brown basally; first flagellar segment pale brown, ringed with dark brown subapically, very pale apically; second segment a little darker, shading to brown subapically, almost white apically; remaining segments brown with no subapical banding but with white rings at basal and distal ends giving flagellum a banded appearance.

Mesothorax: antedorsum brown anteriorly leaving an arrow-shaped mark of pale buff posteriorly, median suture dark brown posteriorly; dorsal lobes pale buff, bordered brown, anterior suture dark brown; scutellum faint brown, posterior suture dark. Metathorax: antedorsum pale; dorsal lobes and scutellum brown, sutures dark. Thoracic pleura buff with brown patches. Legs: coxae brown, sutures very dark; trochanters brown basally and ventrally; femora marked with light brown on outer edge at ends and in middle, otherwise pale cream; tibiae pale shading to brown apically; first tarsal segment pale shading to brown distally, second and third segments wholly dark brown; claws dark brown. Wings: fore wing (fig. 43) mottled in various shades of brown, margin and veins (except cu_1) with alternating light and dark sections, this banding particularly prominent in basal half of wing where light sections are almost white. Hind wing (fig. 44) hyaline, faintly tinged brown, darker in costal area, anterior margin indistinctly banded, veins brown.

Table VI.—*Length (in mm.) of various characters of four males of* Myopsocus elongatus

Fw	3·420	3·390	3·260	.
Hw	2·550	2·580	2·500	2·560
A	4·930	.	.	.
f_1	0·825	0·825	0·825	0·760
f_2	0·895	0·860	0·850	0·825
w	0·033	0·035	0·033	0·033
Hf	0·670	0·660	0·650	0·705
Ht	1·320	1·300	1·240	1·340
t_1	0·415	0·410	0·420	0·450
t_2	0·060	0·068	0·065	0·068
t_3*	0·114	0·106	0·106	0·109
Ratio f_1/f_2	0·93	0·96	0·97	0·92
Ratio t_1/t_2	6·92	6·03	6·46	6·62
Ratio t_2/t_3	0·53	0·64	0·61	0·62

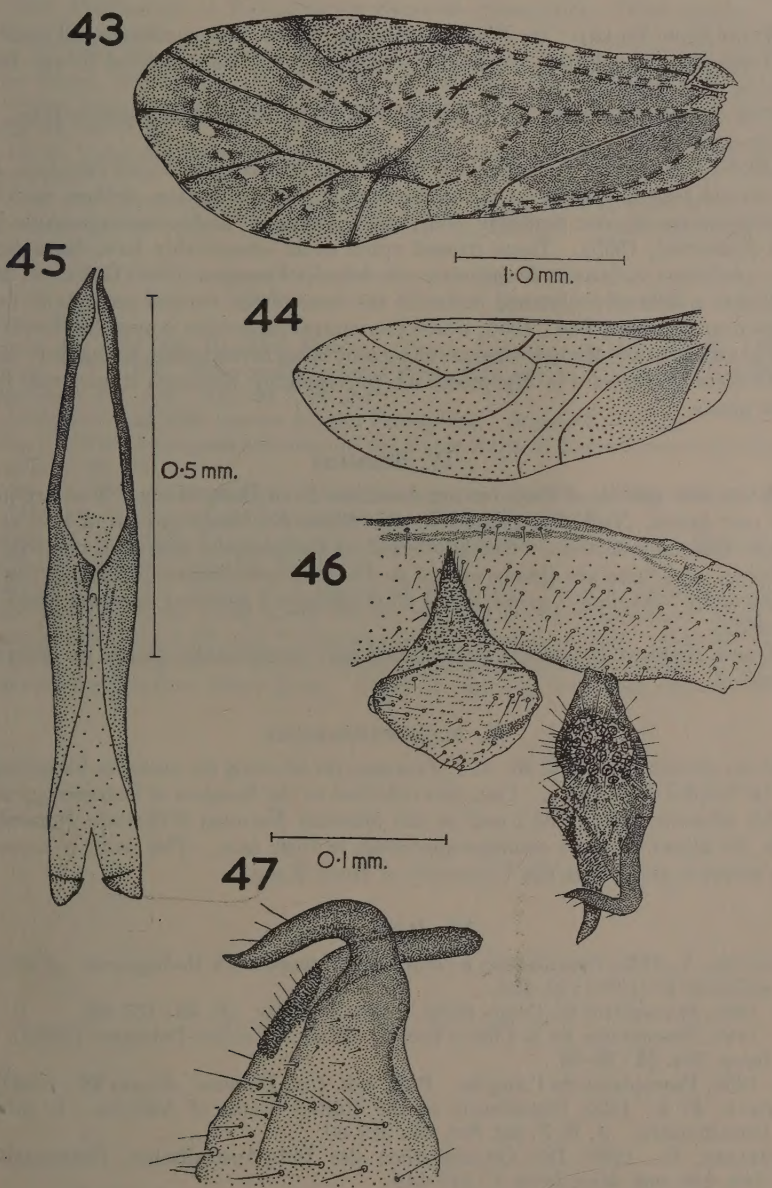
* Distal hind tarsal segment.

Abdomen dorsally pale cream with three longitudinal dark brown bands, median one narrow, laterals wide, ninth tergite dark brown; paraprocts brown, edged dark brown; epiproct buff, edged dark brown; abdomen ventrally pale cream, hypandrium brown.

Morphology.—Eyes not particularly prominent.

Number of ctenidiobothria on first hind tarsal segment: 20–24 (4 specimens). Hind wing (fig. 44) with *rr* and *m* joined by a cross-vein.

Genitalia: hypandrium (fig. 42) with broad median tract of setae and a pair of very long setae just anterior to posterior margin which is heavily sclerotised medially; two lateral groups of about a dozen setae. Phallosome (fig. 45) elongate, well sclerotised, terminating in a pair of stout, dorsally directed hooks.



FIGS. 43–47.—*Myopsocus elongatus*, male: (43) fore wing; (44) hind wing; (45) phallosome; (46) apex of abdomen; (47) apex of left paraproct. Figs. 43–44 and 45–46 have common scales.

Apex of abdomen (fig. 46): epiproct with a pointed flap projecting anteriorly over ninth tergite, apex of flap with short closely appressed bristles; paraprocts marginally well sclerotised, setose in apical half, with two stout crossed spurs apically, the upper lightly setose, the lower with a dense field of chitinous scale-like papillae and fine hairs on its median margin basally (fig. 47), a circular field of 39–42 trichobothria.

Dimensions.—Body length (in alcohol): 2·7 mm. Dimensions of other characters as in Table VI.

Hong Kong Island: on *Pinus massoniana*, iv.58, four specimens, all male.

Holotype ♂ in author's collection, paratype ♂ will be deposited in the British Museum (Nat. Hist.).

This species is assigned, on venation of the hind wing, to *Myopsocus* Hag., 1866 *s.l.* (Roesler, 1944).

Although the flap of the epiproct is like that of *Rhaptoneura crypta* Smithers, 1957, the crossed terminal spurs on the paraprocts fit the description of these structures in *Lichenomima maxima* Smithers, 1957, and the figure of *Lichenomima pauliani* Bad., 1949 (Badonnel, 1955). These crossed spurs could conceivably have been derived from conditions such as in *Lichenomima intermedia* Pearman, 1934 (Badonnel, 1946), which has a field of sculptured scales at the base of the ventral projection, and in *Rhaptoneura africana* Bad., 1955, where the ventral projection is even less developed.

The genera of the Myopsocinae are at present being investigated, so that it is expedient to leave this species in *Myopsocus* s.l. provisionally, although it may well typify a new genus.

IV. Summary

Seven new species of Psocidae are described from Hong Kong. Two are placed in a new genus, *Neoblaste*, related to the *Blaste-Euclismia* groups of species but distinct from any of them. One is referred to *Psococerastis* Pearman, one to *Ptycta* Enderlein, and three are closely related to *Psocidus zanzibarensis* Pearman, the type species of an " omnibus " genus, which thus assumes a new and narrower sense than hitherto.

A new aberrant Myopsocid is described and provisionally placed in *Myopsocus* Hagen *s.l.*

V. Acknowledgments

It is a pleasure to thank Mr. J. V. Pearman for allowing me access to his collection, and for helpful discussions. I am also indebted to the Keepers of Entomology at the British Museum (Nat. Hist.) and at the Muséum National d'Histoire Naturelle in Paris, for allowing me to examine specimens in their care. This work is supported by a research grant from the University of Hong Kong.

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